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The effect of tail docking on the welfare of pigs housed under challenging conditions



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ABSTRACT

This study was performed to investigate the effect of tail docking in the weaner and finishing phase in 448 heavy pigs (slaughtered at 40 weeks of age and 170 kg) reared under challenging conditions that were previously considered as risk factors for tail biting (e.g., male gender, high stocking density, fully slatted floor and poor health). The finishing unit had a history of mortality higher than 5%, mainly due to Porcine Reproductive and Respiratory Syndrome, Influenza and *Actinobacillus pleuropneumoniae* circulation. In both units, a rack with straw and a metal chain were constantly available in all pens. A 2 × 2 factorial design was adopted to test the effects of gender and tail presence on blood measures (cortisol, haptoglobin, and albumin/globulin ratio), behaviour and skin lesions. Tail docking did not have an effect on the physiological measures, conflicts, and ear and tail biting behaviours at the weaner phase or at fattening. However, in the last days of the weaner phase, an outbreak of tail biting triggered by a “biter” was recorded in one pen of barrows. At fattening, tail docking did not produce any significant difference regarding skin lesions on the ears, the front, the middle and the back third of the animals. Nevertheless, undocked animals showed a higher prevalence of mild tail lesions ($P < 0.01$) and a lower frequency of belly nosing behaviour ($P = 0.04$). In undocked animals, the average frequency of severe tail lesions was 3.6%, whereas the average frequency of mild tail lesions was 18.57%. Two peaks were detected at 12 and 32 weeks of age ($P = 0.01$), i.e., at the beginning and in the middle of the fattening period. Overall, the behavioural activities of exploring chain decreased throughout the fattening cycle ($P = 0.02$), whereas the activity of exploring straw in the rack increased according to age ($P = 0.05$). The frequency of ear biting showed a decrease ($P = 0.02$), whereas the frequency of lying behaviour increased ($P = 0.04$). The mortality was approximately 5%: 4.5% in undocked vs. 5.5% in docked pigs; 6.5% in barrows vs. 3.5% in females. The straw consumption was 5 g/pig/day at the weaner phase and 30 g/pig/day at fattening. The results did not demonstrate a generalised welfare endangerment directly related to tail biting in undocked heavy pigs housed under challenging conditions.

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1. Introduction

Tail biting (TB) is a major welfare concern for pigs (Sonoda et al., 2013; D'Eath et al. 2014). TB has a multifactorial origin and occurs mainly in fattening pigs. High

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stocking densities, barren environments, bad air quality and poor health are considered to be significant risk factors (Sonoda et al., 2013). The European Food Safety Authority (EFSA, 2007) comprehensively discussed the role of all the possible factors of TB occurrence, such as nutritional deficiencies, heritability and male gender. According to several publications, the absence of straw appears to be one of the major contributing factors for TB. At present, TB represents a relevant subject due to its complexity (Sonoda et al., 2013) and to the requirement of the European animal welfare legislation (EU Council Directive 2008/120) to constrain routine tail docking.

Despite this, only a few northern European countries with a minor share in the swine industry have banned this practice (Edman, 2014). According to the data collected in six UK abattoirs, the prevalence of animals with signs of lesions was 2.4% in docked pigs, whereas 8.5% in undocked pigs (Hunter et al., 2001). In a Finnish abattoir tail damages in undocked pigs were recorded at a prevalence of 34.6% (Valros et al., 2004). These data suggest that the ban of tail docking is likely to variably increase the risk of TB. However, tail docking is painful and can lead to acute physiological and behavioural responses (Sutherland et al., 2008). Moreover, it is often a way to hide the consequences of poor rearing conditions and a significant reduction in the risk of TB can be achieved on many farms through the systematic evaluation and modification of management practices (Taylor et al., 2012). Limited data are available on specialised pig production systems for cured meat (slaughtered at a minimum of nine months of age and 160 kg l.w.); these animals are potentially reared under more stressful conditions in comparison to conventional systems. In fact, the EU Council Directive 2008/120/EC does not note any specific requirement in terms of individual space, therefore allowing farmers to apply a stocking density of 1 m²/pig, suitable for pigs 'heavier than 110 kg'. A previous trial showed the feasibility of avoiding tail docking in heavy pigs when reared on solid floors in farms with good health management (e.g., good application of vaccination protocols and a historically recorded mortality at fattening of 1–2%) (Scollo et al., 2013).

A poor health status related to pathogens is a common condition in pig herds and was reported to be a risk factor for triggering tail biting (Moinard et al., 2003; Walker and Bilkei, 2006). In particular, Moinard et al. (2003) found a 3.9-fold increase in the risk of tail biting when post-weaning mortality was above 2.5%. Moreover, according to Scott et al. (2006), slatted floors are reported as a risk factor for TB. For these reasons, the aim of this study was to investigate the effect of tail docking on the welfare of heavy pigs under challenging conditions, which are likely to occur in commercial farms despite fulfilling the European legislation requirements.

2. Materials and methods

2.1. Experimental design, animals and management

This study evaluated the effects of tail docking (128 docked vs. 320 undocked pigs) and gender (224 barrows vs. 224 females) in 448 commercial crossbred pigs (Landrace × Large White) on several health and welfare indicators

using a 2 × 2 factorial design during the weaner and finishing phase. The choice to use a reduced number of docked animals was supported by ethical reasons to reduce, as much as possible, the adoption of painful procedures, while assuring a representative sample of docked animals for statistical analysis of the data. Tails were docked by removing 2/3 of their length by means of cauterisation at 5 days of age in the farrowing room; at the same time, all males were surgically castrated (in compliance with Council Directive 2008/120). The study lasted 36 weeks (December 2010–August 2011), and it was conducted in two commercial open-sites: the former for the weaner phase (eight weeks) and the latter for the fattening phase (28 weeks). In terms of the chemical composition and amount delivered, the feeding plans used in the study were formulated according to the nutritional requirements of heavy pigs as proposed by Bertacchini and Campani (2001). All experimental procedures and animal care were performed in accordance with Italian legislation on the protection of animals used for experimental and other scientific purposes (LD-116, Jan. 27, 1992, actually abrogated by LD-26, Mar. 14, 2014).

2.1.1. Weaner phase

Upon arrival from the farrowing unit, piglets were 3 weeks of age and 8.39 ± 1.46 kg l.w. No vaccination protocol against PRRS was applied. Animals were housed in 14 pens of 32 heads (space allowance of 0.32 m²/pig) with a plastic, fully slatted floor (14 mm width). The pens were distributed in two rows, divided by a corridor and divided by gender (seven pens of barrows and seven of females) and tail docking (four pens of docked and 10 of undocked pigs). In each pen, drinking water and a dry complete mixture of floury feed were available *ad libitum* through a nipple and a trough (0.6 m length), respectively. As manipulable materials, a plastic chain hanging from the wall, an oak wood stump (20 cm length and 8 cm diameter) on the floor, and a rack (9 kg capacity and 5 × 5 cm² mesh) containing long straw were always available (the racks were replenished once per week in order to be never left empty). Ten animals per pen (for a total of 140 pigs) were randomly selected and an electronic tag was attached to one ear (Allflex USA, Inc., Dallas/Fort Worth Airport, Texas, USA) for identification in the pen throughout the study to repeat blood sampling on the same animals.

2.1.2. Finishing phase

All the animals were transported to the finishing unit on the same day (approximately 180 km from the weaner unit). Animals from different pens were mixed during transport. The finishing unit was chosen because of a recent history of high mortality (*i.e.*, approximately 5%) mainly due to Porcine Reproductive and Respiratory Syndrome (PRRS) virus, Influenza virus and *Actinobacillus pleuropneumoniae* (APP) circulation. Upon arrival at the fattening unit, the pigs were 12 weeks of age and 34.82 ± 5.77 kg l.w. The animals were distributed into 22 pens of 19 heads each according to gender (11 pens of barrows and 11 of females) and tail docking (six pens of docked and 16 of undocked pigs). The pens had a concrete, fully slatted floor (18 mm width; space allowance of 1.04 m²/pig) and were provided with a metal chain and the same straw rack used at the weaner phase

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